

**WHAT IS CLAIMED IS:**

1. A composition comprising an adeno-associated viral vector that comprises a nucleic acid segment encoding a pro-opiomelanocortin polypeptide operably linked to a promoter capable of expressing said segment in a host cell that comprises said vector, wherein said polypeptide activates the central melanocortin pathway in a mammal that expresses said vector.
2. The composition of claim 1, wherein said vector further comprises an enhancer sequence operably linked to said nucleic acid segment.
3. The composition of claim 1, wherein said vector further comprises a post-transcriptional regulatory element operably linked to said nucleic acid segment.
4. The composition of claim 1, wherein said nucleic acid segment encodes a mammalian pro-opiomelanocortin polypeptide.
5. The composition of claim 1, wherein said promoter is an inducible promoter.
6. The composition of claim 1, further comprising a pharmaceutically-acceptable excipient.
7. The composition of claim 1, wherein said vector is comprised within an rAAV virion.

8. The composition of claim 7, further comprising a liposome, a lipid, or a lipid complex.

5 9. The composition of claim 7, further comprising a microsphere or a nanoparticle.

10. The composition of claim 7, formulated for administration to a human.

10 11. The composition of claim 1, comprised within a kit for diagnosing, preventing, treating or ameliorating the symptoms of a pro-opiomelanocortin polypeptide deficiency condition in a mammal.

15 12. A recombinant adeno-associated viral particle comprising an adeno-associated viral vector that comprises a nucleic acid segment encoding a pro-opiomelanocortin polypeptide operably linked to a promoter capable of expressing said segment in a host cell that comprises said vector, wherein said polypeptide activates the central melanocortin pathway in a mammal that expresses said vector.

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25 13. A method for treating or ameliorating the symptoms of a pro-opiomelanocortin polypeptide deficiency condition in a mammal, said method comprising administering to said mammal the composition of claim 1; in an amount and for a time sufficient to treat or ameliorate the symptoms of said deficiency in said mammal.

30 14. The method of claim 13, wherein said deficiency condition results in polyphagia, hyperinsulinemia, adiposity, an eating disorder, or body weight gain in said mammal.

15. The method of claim 13, wherein said composition is administered to said mammal in an amount and for a time sufficient to decrease the body weight of said mammal, or to decrease the rate of body weight gain in said mammal.

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16. The method of claim 13, wherein said composition is administered to said mammal intramuscularly, intravenously, intrathecally, or intracerebroventricularly.

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17. A method for providing a mammal in need thereof with a therapeutically-effective amount of a pro-opiomelanocortin polypeptide, said method comprising introducing into suitable cells or a tissue of said mammal, an amount of the composition of claim 1; for a time effective to provide said mammal with a therapeutically-effective amount of said pro-opiomelanocortin polypeptide.

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18. The method of claim 17, wherein said composition is introduced into said cells or said tissue *ex vivo*; and further wherein said method comprises the additional step of introducing the resulting cells or tissue that comprise said composition into said mammal.

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19. The method of claim 17, wherein said mammal has been diagnosed with obesity, adiposity, or suffers from excessive body weight gain.

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20. A method for controlling body weight gain or food intake in a mammal, said method comprising at least the step of introducing into a cell or tissue of the brain of said mammal, a therapeutically-effective amount of the composition of claim 1, for a time effective to control said body weight gain or said food intake in said mammal.

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